

Safety Laser Scanner OS32C

World's Most Compact Level Safety Laser Scanner



» Power consumption saving up to 50%

» Simple and versatile to solve many applications

» Easy handling and installation

Low profile allows installation in small spaces

For collision avoidance of AGVs (Automated Guided Vehicles)

For intrusion detection through an entrance

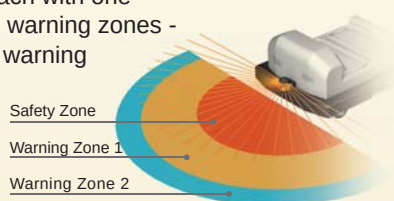
For presence detection within a machine's hazardous area



Flexible zone configurations

Industry Best

For complex AGV applications, up to 70 combinations - each with one safety zone and two warning zones - can be set. The two warning zones can be set to support various purposes such as warning sound and speed control.



Simplified Wiring

OMRON STI's innovative I/O method requires fewer inputs when configuring multiple zones. Only 4 inputs are required to select from 6 zone sets. If all 8 inputs are used, up to 70 zone sets are available.

* U.S. patent pending.

Features



270° detection angle

World's Most Compact Level

Small Size

104.5 mm

Compact and versatile safety laser scanner

Lightweight

1.3 kg

Lightweight body for easy handling and installation

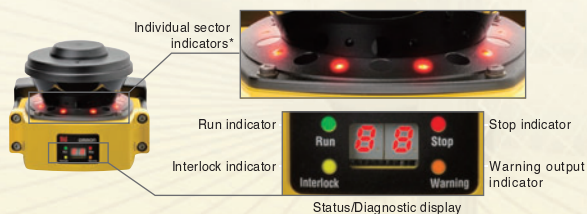
Low Power Consumption

5 W

Low power consumption reduces battery load on the AGV (3.75 W in standby mode)

Operating state can be determined at a glance

Eight sector indicators show the direction of intrusion. Front display shows operating state and error codes.

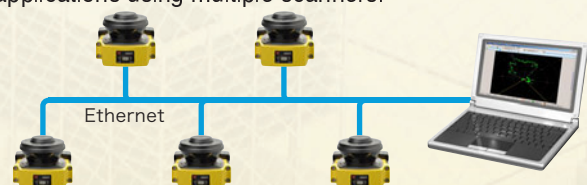


* US patent No.: US 6,753,776 B2

Industry First

Integrated management via Ethernet

Industry's first Ethernet-compliant Safety Laser Scanner allows the user to check operating state and analyze the cause of an emergency stop via LAN even in large-scale applications using multiple scanners.



Applications

Collision Avoidance

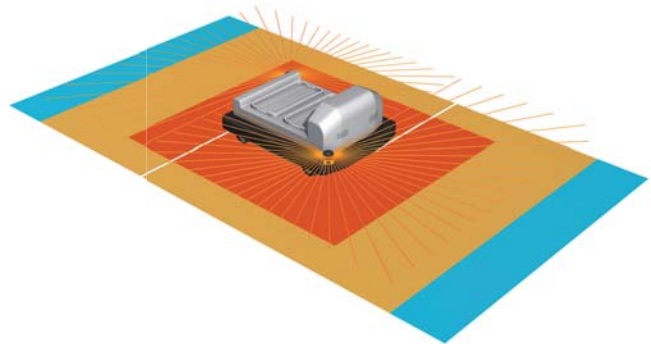
Small, light and compact body provides for easy installation on an AGV.

Low power consumption (5W) reduces battery load on the AGV. (3.75 W in standby mode)

Up to 70 zone set combinations support complex AGV tracks.



Front/Rear monitoring



All-around Monitoring

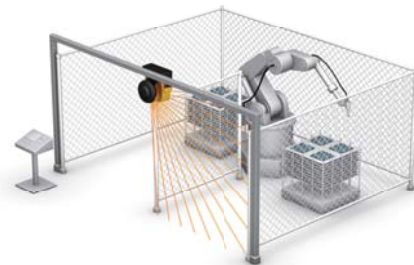
Intrusion Detection

Reference Boundary Monitoring function supports intrusion detection without physically blocking the entrance.

Supports various operation patterns by switching zone sets.



Intrusion detection with vertical installation



Safety zone can be selected

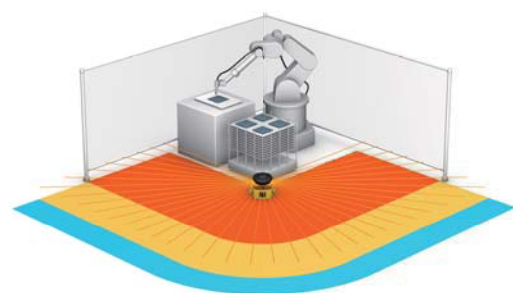
Presence Detection

Compact body allows for use inside the machine.

Detection angle of 270° provides coverage of two sides with one scanner.



Guarding inside the machine



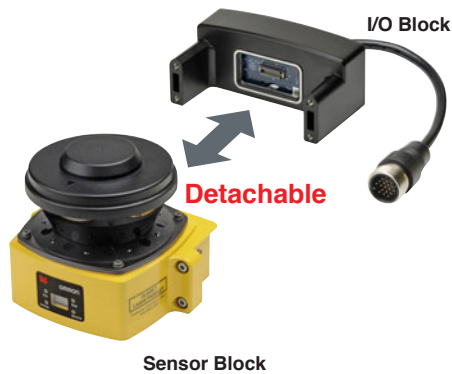
Presence detection of 270°

New convenient and easy-to-use functions

NEW

Replacable sensor, no reprogramming needed

No reprogramming needed, the configuration is stored in the I/O block. Replacing a damaged sensor is fast and easy.

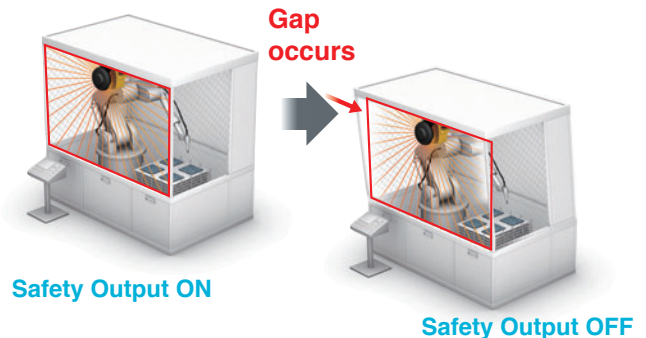


NEW

Reference Boundary Monitoring function

The OS32C constantly monitors reference points and turns OFF the safety outputs when a shift in its position is detected.

(Per international standard IEC 61496-3, area scanners used in applications where the angle of approach exceeds ± 30 degrees with respect to the detection plane, must use RBM in the detection zone.)



Cable Access Options

To tailor the OS32C to your installation, two options are available for the location of the power and ethernet connections:

OS32C-BP (Cable access from the back)

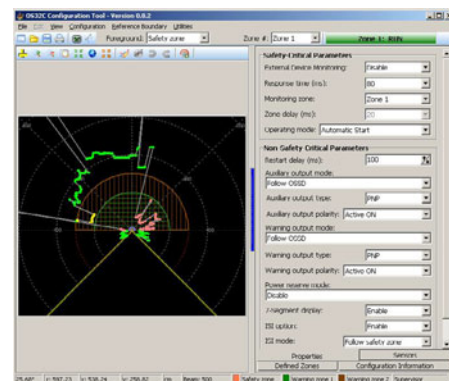
OS32C-SP1 (Cable access from the left side)

These can be selected according to the needs of AGV or facilities design.



Easy configuration of complex zones

The configuration of the safety zone and warning zones can be done in real time using a PC. Configurations can also be created or modified offline.



Provides Safety Category 3 safety circuit without a dedicated controller

Compliant to global safety standards

ISO 13849-1 PLd

SIL2



Response time can be set from 80 ms to 680 ms

Response time adjustment can filter out erroneous detections (machine stoppage) caused by pollutants in the environment.

Operating Theory of OS32C

The OS32C uses time-of-flight (TOF) measurement to determine distance. The scanner emits a laser pulse, when the pulse hits an object the signal is reflected to the scanner. The OS32C then compares the distance/position of the object against the defined safety zone.

Safety Laser Scanner

OS32C

OS32C Safety Laser Scanner Featuring the World's Most Compact Level Size (104.5 mm), Low Power Consumption (5 W) and Lightweight (1.3 kg).



- Type 3 Safety Laser Scanner complies with IEC61496-1/-3.
- 70 sets of safety zone and warning zone combinations are available, supporting complicated changes in working environments.
- A safety radius up to 3 m and warning zone(s) radius up to 10 m can be set.
- 8 Individual Sector Indicators and various LED indications allow the user to determine scanner status at a glance.
- The Configuration Tool makes complex zone combinations easy.
- Provides a safety circuit of Performance Level d and safety category 3 (ISO13849-1) without a dedicated controller.
- The response time is configurable from 80 ms to a maximum of 680 ms.
- Provides integrated management via Ethernet.
- Reference Boundary Monitoring function prevents unauthorized changes in the scanner position.
- Minimal down time, sensor block can be replaced without the need to reprogram.



Refer to "Safety Precautions" on page 16.

Ordering Information

OS32C (Power cable is sold separately.)

Appearance	Description	Model	Remarks
	OS32C with back location cable entry	OS32C-BP	CD-ROM (Configuration software) OS supported: Windows 2000, Windows XP, Windows Vista
	OS32C with side location cable entry *	OS32C-SP1	

* For OS32C-SP1, each connector is located on the left as viewed from the back of the I/O block.

Power Cable

Appearance	Description	Model	Remarks
	Cable length: 3 m	OS32C-CBL-03M	One cable is required per sensor.
	Cable length: 10 m	OS32C-CBL-10M	
	Cable length: 20 m	OS32C-CBL-20M	
	Cable length: 30 m	OS32C-CBL-30M	

Ethernet Cable

Appearance	Description	Model	Remarks
	Cable length: 2 m	OS32C-ECBL-02M	Required for configuration and monitoring.
	Cable length: 5 m	OS32C-ECBL-05M	
	Cable length: 15 m	OS32C-ECBL-15M	

Note: An ethernet cable with an M12, 4-pin connector is required.

Mounting Brackets

Appearance	Description		Model	Remarks
	Bottom/side mounting bracket		OS32C-BKT1	Bottom/side mounting bracket x 1, unit mounting screws x 4 sets
	XY axis rotation mounting bracket		OS32C-BKT2	XY axis rotation mounting bracket x 1, unit mounting screws x 6 sets, bracket mounting screws x 1 set (must be used with OS32C-BKT1)
	Simple mounting bracket		OS32C-BKT3	Simple mounting brackets x 2, unit mounting screws x 4 sets *
	Protective cover for window		OS32C-BKT4	
	Mounting stand		OS32C-MT	When using a mounting stand, use an OS32C with side location cable entry (OS32C-SP1). The OS32C with back location cable entry (OS32C-BP) cannot be mounted. Use with mounting brackets (OS32C-BKT1 and OS32C-BKT2).
	Hardware kit for mounting stand		OS32C-HDT	Mounting screws x 3 sets Use this when mounting a bracket to the mounting stand.

* There are eight OS32C mounting screws: four screws for singular use, and four screws for protective cover for window.

Accessories

Appearance	Description		Model	Remarks
	Scan window		OS32C-WIN-KT	Spare for replacement
	Sensor block without I/O block		OS32C-SN	Spare for replacement
	I/O block	With cable access from the back	OS32C-CBBP	Spare for replacement
		With cable access from the left side	OS32C-CBSP1	Spare for replacement

Rating/Performance

Sensor Type		Type 3 Safety Laser Scanner
Safety Category		Category 3, Performance Level d (ISO13849-1: 2008)
Detection Capability		Non-transparent with a diameter of 70 mm (1.8% reflectivity or greater)
Monitoring Zone		Monitoring Zone Set Count: (Safety Zone + 2 Warning Zones) x 70 sets
Operating Range		Safety zone radius up to 3 m, Warning Zone radius up to 10 m.
Maximum Measurement Error		100 mm *1
Detection Angle		270°
Angular Resolution		0.4°
Laser Beam Diameter		6 mm at optics cover, 14 mm at 3 m.
Response Time		Response time from ON to OFF: From 80 ms (2 scans) to 680 ms (up to 17 scans) Response time from OFF to ON: Response time from ON to OFF + 100 ms to 60 s (Configurable)
Zone Switching Time		20 to 320 ms
Line Voltage		24 VDC +25%/-30% (ripple p-p 2.5 V max.) *2
Power Consumption		Normal operation: 5 W max., 4 W typical (without output load) *3 Standby mode: 3.75 W (without output load)
Emission Source (Wavelength)		Infrared Laser Diode (905 nm)
Laser Protection Class		Class 1: IEC/EN60825-1 (2007) Class 1: JIS6802 (2005) Class I: CFR21 1040.10, 1040.11
Safety Output (OSSD)		PNP transistor x 2, load current of 250mA max., residual voltage of 2 V max., load capacity of 2.2 µf max., leak current of 1 mA max. *3, *4, *5
Auxiliary Output (Non-Safety)		NPN/PNP transistor x 1, load current of 100 mA max., residual voltage of 2 V max., leak current of 1 mA max. *4, *5, *7
Warning Output (Non-Safety)		NPN/PNP transistor x 1, load current of 100 mA max., residual voltage of 2 V max., leak current of 1 mA max. *4, *5, *7
Output Operation Mode		Auto Start, Start Interlock, Start/Restart Interlock
Input	External Device Monitoring (EDM)	ON: 0 V short (input current of 50 mA), OFF: Open
	Start	ON: 0 V short (input current of 20 mA), OFF: Open
	Zone Select	ON: 24 V short (input current of 5 mA), OFF: Open
	Stand-by	ON: 24 V short (input current of 5 mA), OFF: Open
Connection Type		Power Cable: 18-pin mini-connector (pigtail) Communication Cable: M12, 4-pin connector
Connection with PC *6		Communication: Ethernet OS Supported: Windows 2000, Windows XP, Windows Vista
Indicators		RUN indicator: Green, STOP indicator: Red, Interlock Indicator: Yellow, Warning Output Indicator: Orange, Status/Diagnostic Display: 2 x 7-segment LEDs, Intrusion Indicators: Red LED x 8
Protective Circuit		Protection against output load short and reverse power connection
Ambient Temperature		Operation: -10 to 50 deg. C, Storage: -25 to 70 deg. C
Ambient Humidity		Operation & Storage: 95% RH max., non-condensing
Ambient Operation Illumination		Incandescent lamp: Illumination on receiving surface 1500 lx max. (an angle of laser scanning plane and disturbance light must be +/-5 degrees or more)
Enclosure Rating		IP65 (IEC60529)
Enclosure		Sensor head: Die-cast aluminum, optical cover: Polycarbonate, I/O block: Die-cast aluminum
Dimensions (WxHxD)		133.0 x 104.5 x 142.7 mm (except cable)
Dielectric Withstand Voltage		350 VAC, 50/60 Hz, 1 minute
Insulation Resistance		20 mega-ohm or higher (500 VDC)
Impact Resistance		98 m/s ² 1,000 times for each of X, Y, and Z directions (IEC 60068-2-29)
Vibration		10 to 55 Hz double-amplitude of 0.7 mm, 20 sweepings for X, Y, and Z directions (IEC60068-2-6)
Weight (Main Unit only)		1.3 kg
Power Cable		Up to 30 m
Communication Cable		Up to 100 m for 100 BASE-T Cat 5 cable
Accessories		CD-ROM (User's Manual and Configuration Tool)
Approvals		EN61496-1 (Type 3 ESPE), EN62061, EN50178, ISO13849-1 (Category3/PLd), IEC61496-3 (Type3 AOPDDR), IEC61508 (SIL2), EN60204-1, IEC61496-1 (Type3 ESPE), UL508, UL1998, CAN/CSA-C22.2 No. 14, CAN/CSA-C22.2 No. 0.8

*1. An additional measurement error may need to be added due to reflective backgrounds.

*2. For power source specification, refer to "Safety Precautions" on page 16.

*3. Rated current of OS32C is 1.025 A max. (OS32C 210 mA + OSSD A load + OSSD B load + Auxiliary output load + Warning output load + Functional Inputs).
Where functional inputs are: EDM input ... 50 mA Start input ... 20 mA Standby input ... 5 mA Zone X input ... 5 mA x 8 (eight zone set select inputs)

*4. Output voltage is Input voltage - 2.0 VDC.

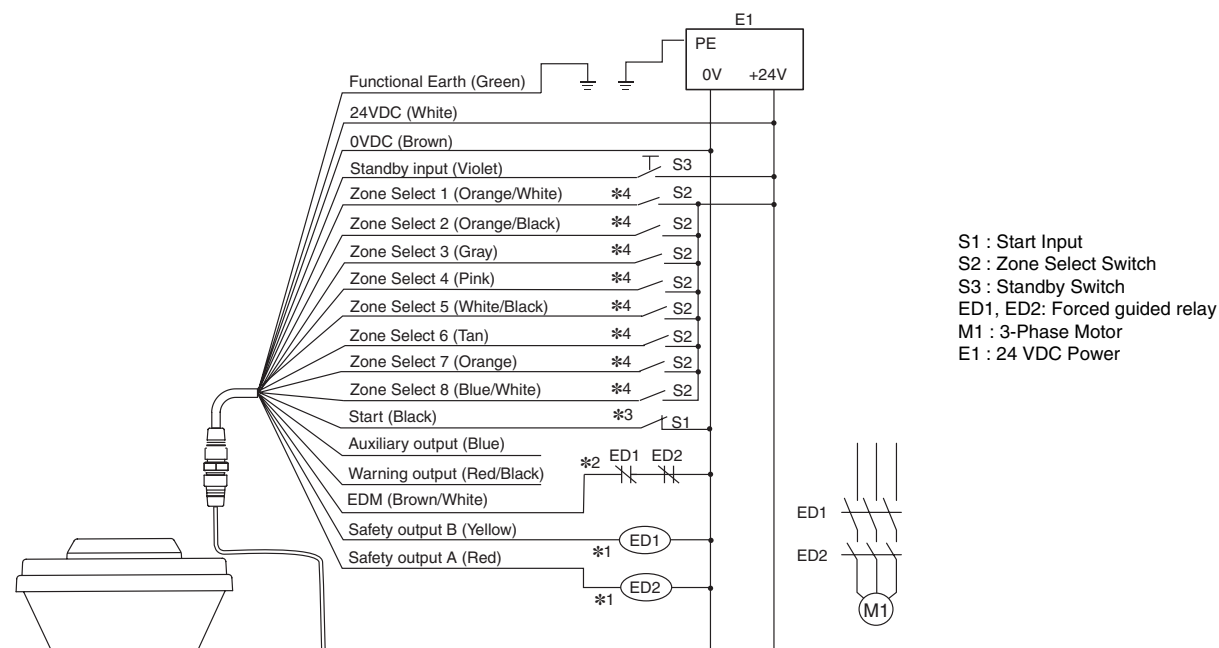
*5. Total consumption current of 2 OSSDs, auxiliary output, and warning output must not exceed 700 mA.

*6. An ethernet cable with an M12, 4-pin connector is required.

*7. Output polarity (NPN/PNP) is configurable via the configuration tool.

Connection

Basic connection with single OS32C unit Category 3, Performance Level d (ISO13849-1)

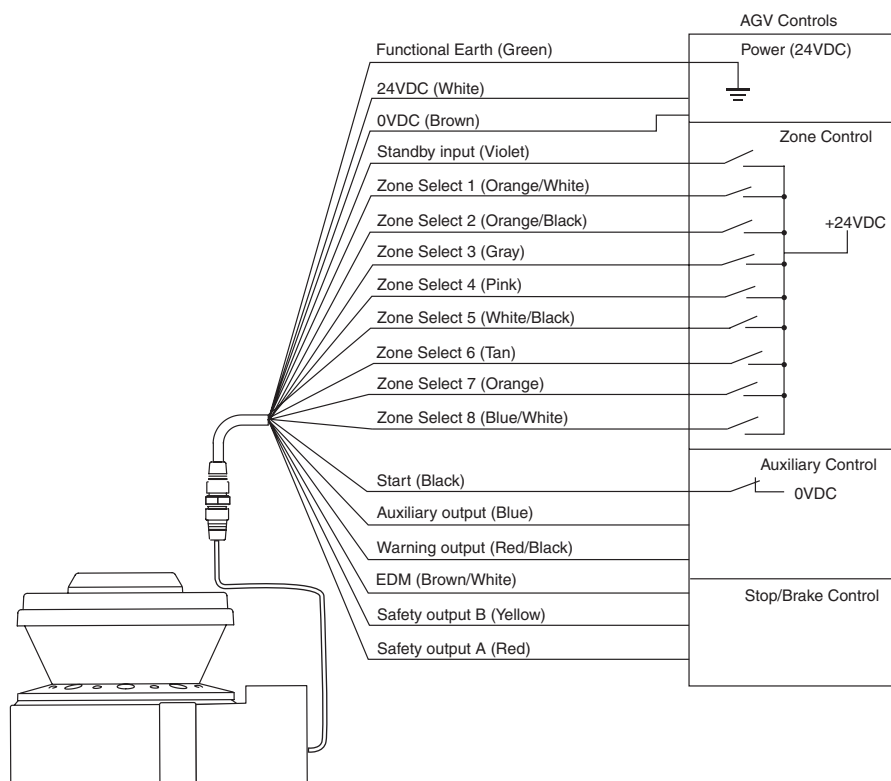


OS32C Configuration

- External Device Monitoring Enabled
- Start/Restart Interlock

- *1. External devices (ED1, ED2) are forced guide relays. (G7Z, G7SA, G7S, etc)
 - *2. If the External Device Monitoring is not used, connect brown/white wires to 0 V, and then turn OFF the External Device Monitoring with the configuration software.
 - *3. Use NC-contact for a start input.
 - *4. For zone select switch setting, refer to OS32C Series User's Manual. When using only one zone, no connection is needed for the zone select inputs.
- Note:** This wiring example is for category 3.

Connecting to AGV Controls Category 3, Performance Level d (ISO13849-1)

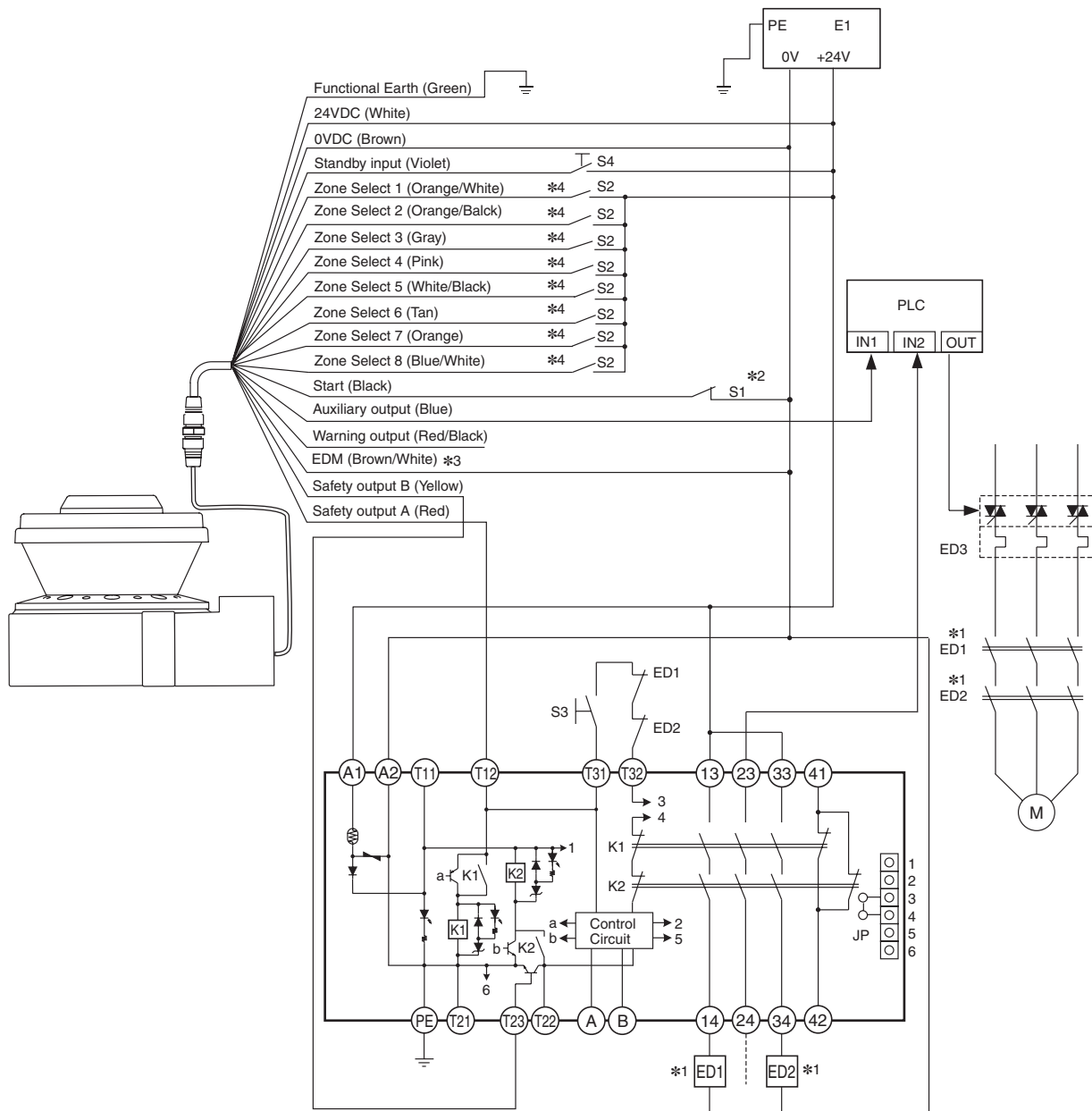


OS32C Configuration

- External Device Monitoring Disabled
- Automatic Start

Note: This wiring example is for category 3. In addition, the circuit configuration of the stop/deceleration control must meet the requirements of category 3.

Connecting to the Controller G9SA-301 Category 3, Performance Level d (ISO13849-1)



ED1, ED2: Forced guided relay
 ED3: Solid state contactor (G3J)
 M : 3-Phase Motor
 S1 : Start Input
 (use for releasing lockout)
 S2 : Zone Select Switch
 S3 : Reset Switch
 S4 : Standby Switch
 E1 : 24 VDC Power
 PLC: Programmable Controller
 (This is for monitoring only and
 unrelated to a safety system)

*1. External devices (ED1, ED2) are forced guide relays. (G7Z, G7SA, G7S, etc)

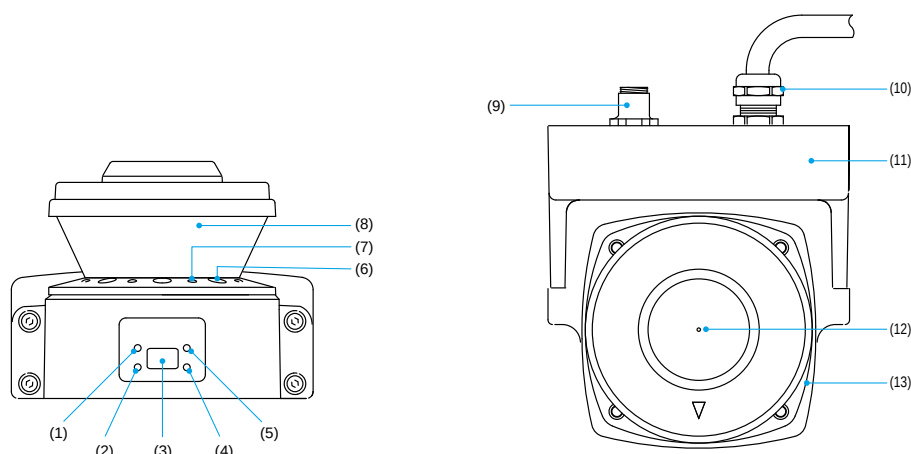
*2. Use NC-contact for a start input.

*3. If the External Device Monitoring is not used, connect brown/white wires to 0V, and then turn OFF the External Device Monitoring with the configuration software.

*4. For zone select switch setting, refer to OS32C Series User's Manual. When using only one zone, no connection is needed for the zone select inputs.

Note: This wiring example is for category 3.

System Components and Functions



Number	Component	Function
(1)	RUN indicator (green)	Will turn ON when safety zone is clear and OSSDs are ON.
(2)	Interlock Indicator (yellow)	Will turn ON when in interlock state, blink under lockout, and blink in case of a failure.
(3)	Status/Diagnostic Display	The scanner status, configuration/operation, or failure is displayed.
(4)	Warning Output Indicator (orange)	Will turn ON when the warning output is ON.
(5)	STOP indicator (red)	Will turn ON when safety zone is blocked, OSSD are OFF or under interlock state.
(6)	Dust Ring	Dust detection cover with reflective surface, for dust accumulation detection
(7)	Individual Sector Indicators	Will turn ON when an intrusion is detected in the safety zone, 8 sectors total. Each sector = 33.75°.
(8)	Scan window	The window where the laser light is emitted and received.
(9)	Ethernet Connector	Used for Ethernet cable connection. *
(10)	Power Connector	18-pin connector (pigtail). *
(11)	I/O Block	Connector module
(12)	Center of rotation	Indicates the location of the axis around which the laser emits.
(13)	Sensor block	Sensor head; field replaceable.

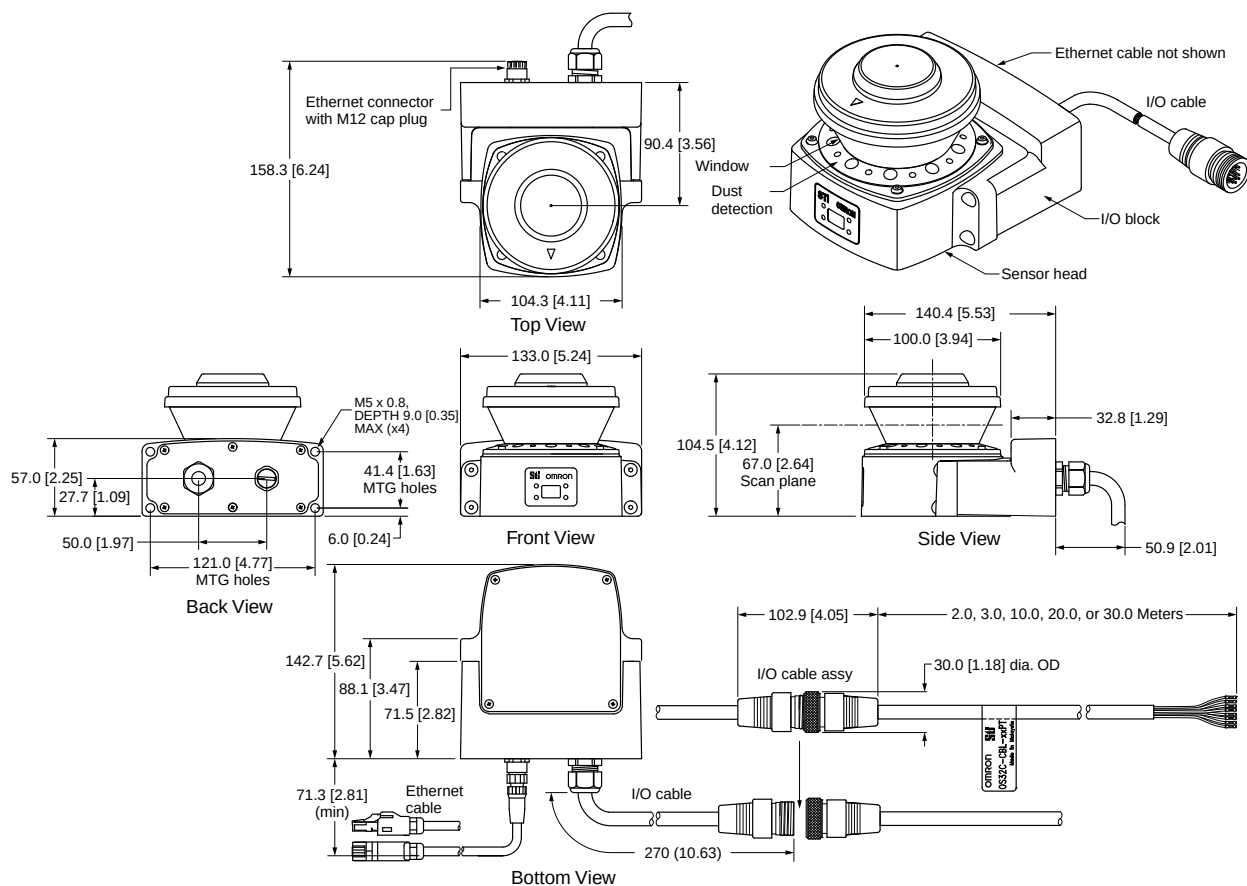
* For OS32C-SP1, each connector is located on the left as viewed from the back of the I/O block.

OS32C

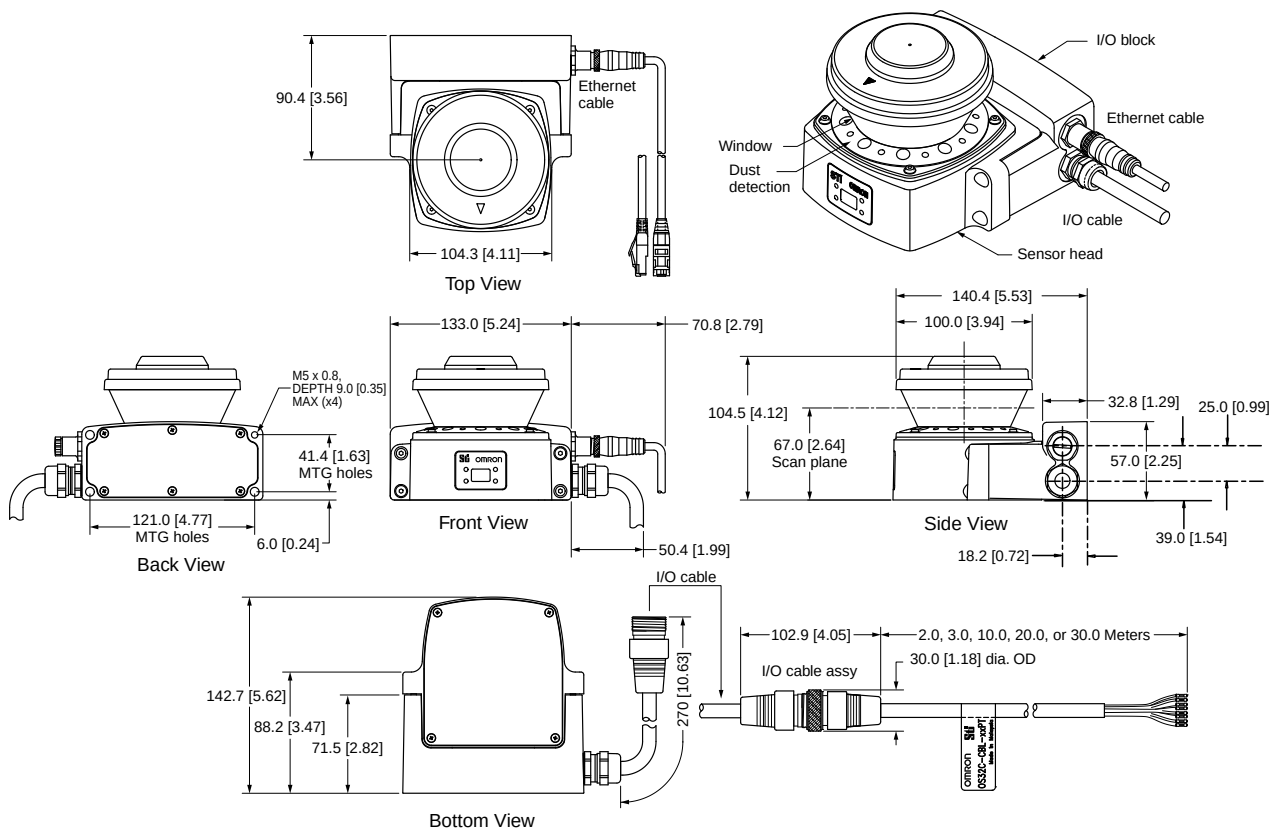
External Dimensional Drawings

(Unit: mm [inch])

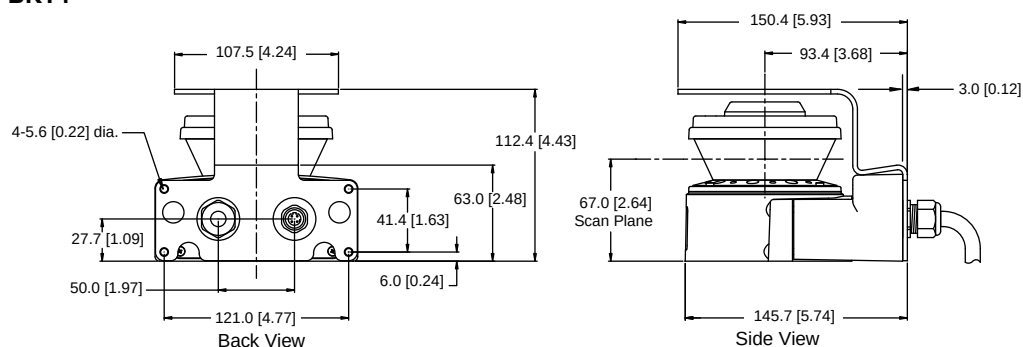
OS32C with Back Location Cable Entry OS32C-BP



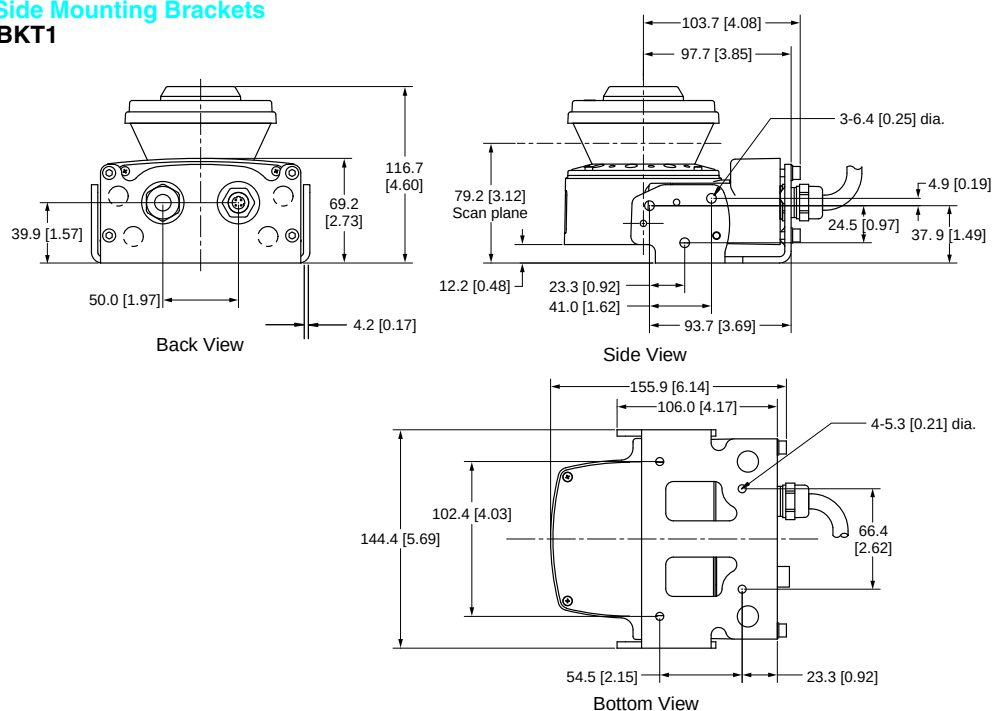
OS32C with Side Location Cable Entry OS32C-SP1



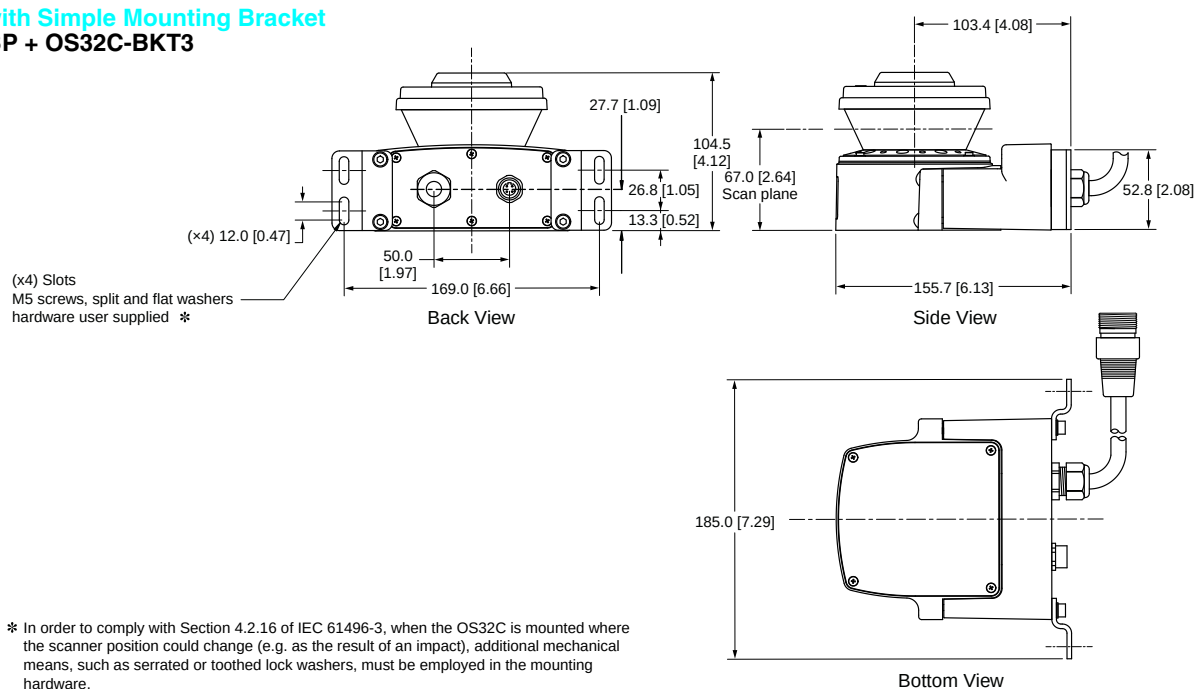
OS32C with Top Guard Kit OS32C-BP + OS32C-BKT4



OS32C with Bottom/Side Mounting Brackets OS32C-BP + OS32C-BKT1



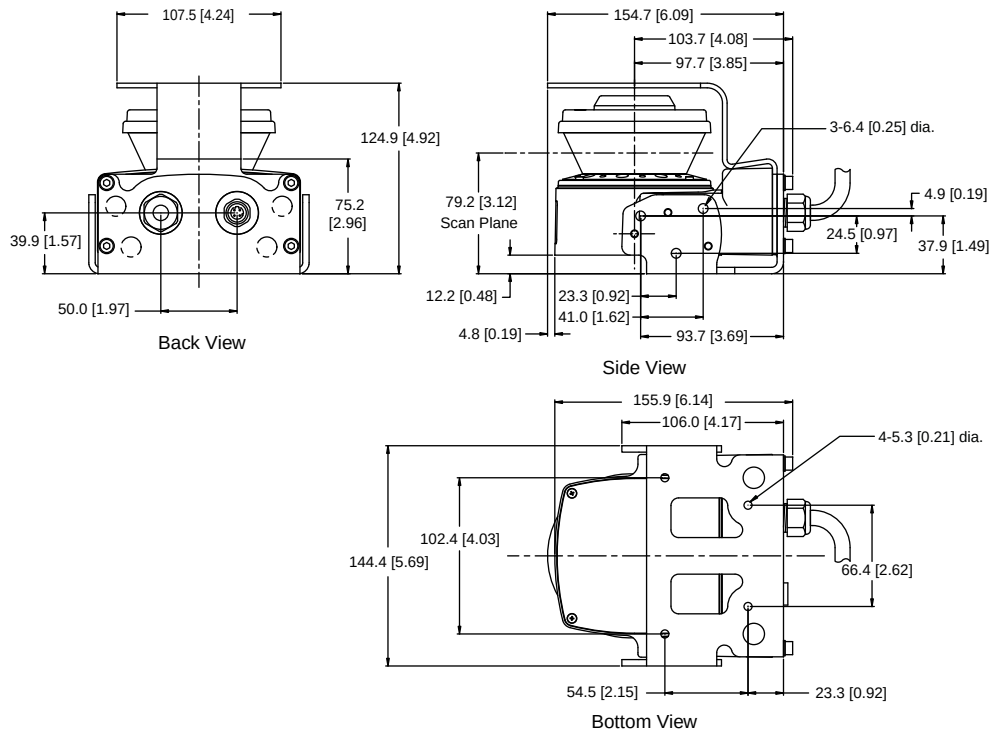
OS32C with Simple Mounting Bracket OS32C-BP + OS32C-BKT3



* In order to comply with Section 4.2.16 of IEC 61496-3, when the OS32C is mounted where the scanner position could change (e.g. as the result of an impact), additional mechanical means, such as serrated or toothed lock washers, must be employed in the mounting hardware.

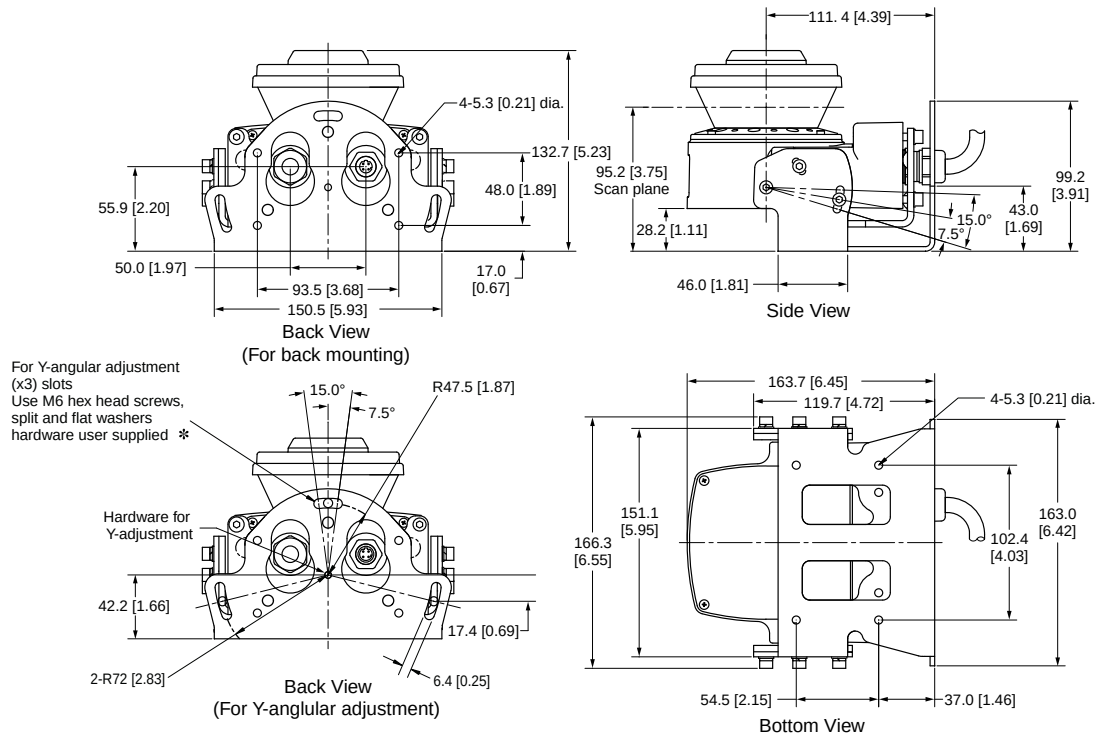
OS32C with Bottom/Side Mounting Brackets and Top Guard Kit

OS32C-BP + OS32C-BKT1 + OS32C-BKT4



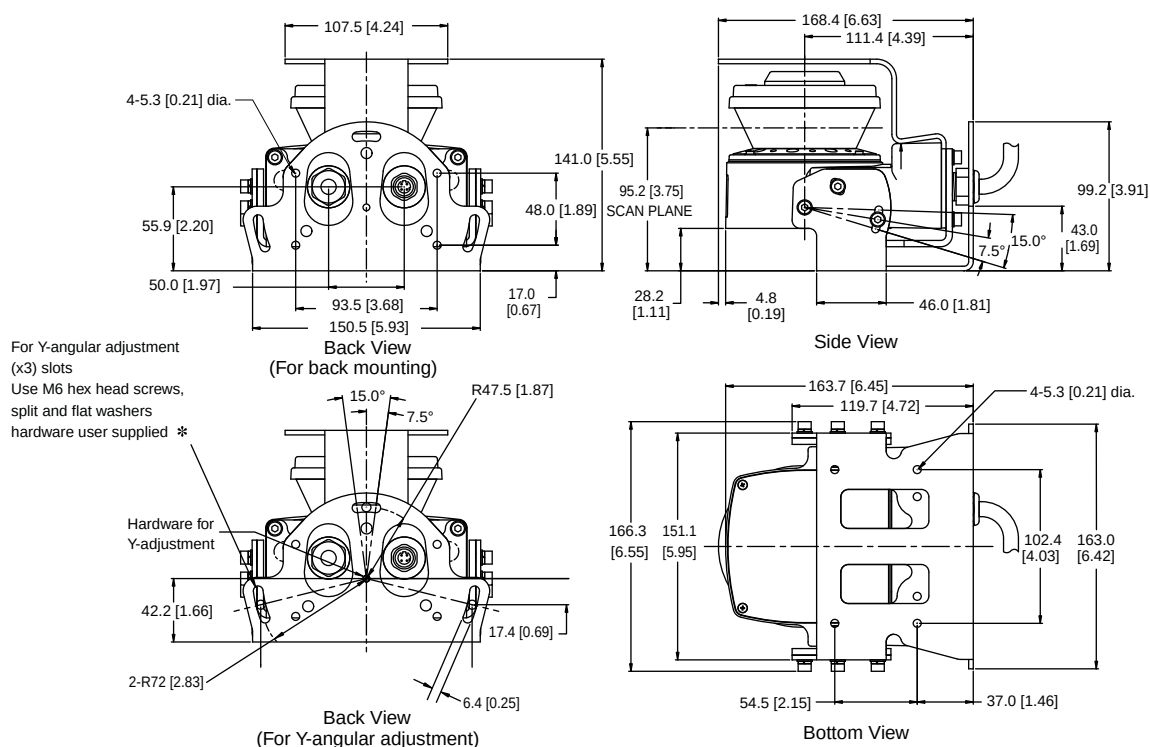
OS32C with Bottom/Side Mounting Brackets and XY Axis Rotation Mounting Kit

OS32C-BP + OS32C-BKT1 + OS32C-BKT2



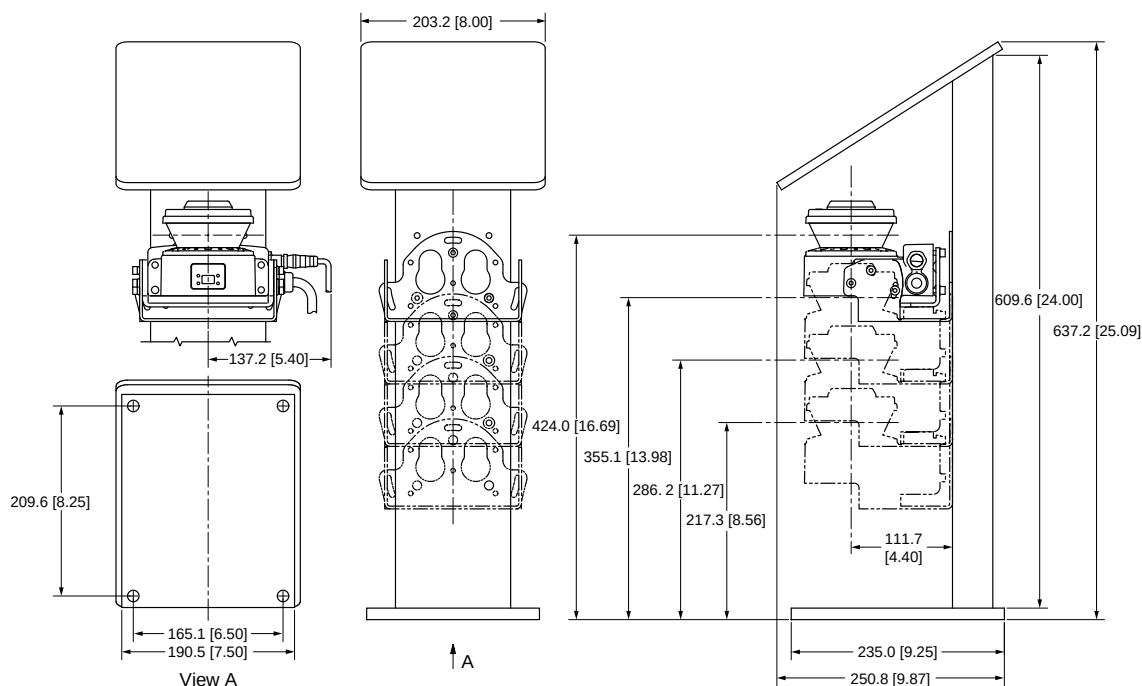
* In order to comply with Section 4.2.16 of IEC 61496-3, when the OS32C is mounted where the scanner position could change (e.g. as the result of an impact), additional mechanical means, such as serrated or toothed lock washers, must be employed in the mounting hardware.

OS32C with Bottom/Side Mounting Brackets, XY Axis Rotation Mounting Kit and Top Guard Kit
OS32C-BP + OS32C-BKT1 + OC32C-BKT2 + OS32C-BKT4

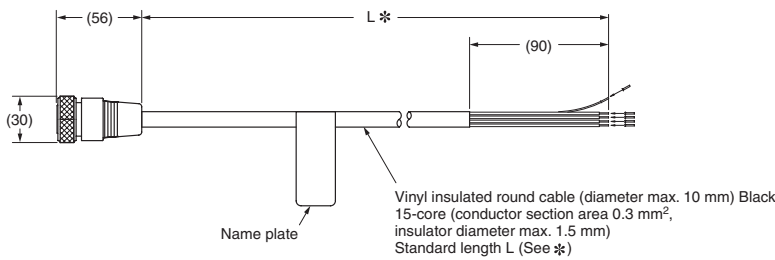


* In order to comply with Section 4.2.16 of IEC 61496-3, when the OS32C is mounted where the scanner position could change (e.g. as the result of an impact), additional mechanical means, such as serrated or toothed lock washers, must be employed in the mounting hardware.

OS32C with Bottom/Side Mounting Brackets, XY Axis Rotation Mounting Kit, Mounting Stand and Mounting Stand Hardware Kit
OS32C-SP1 + OS32C-BKT1 + OS32C-BKT2 + OS32C-MT + OS32C-HDT



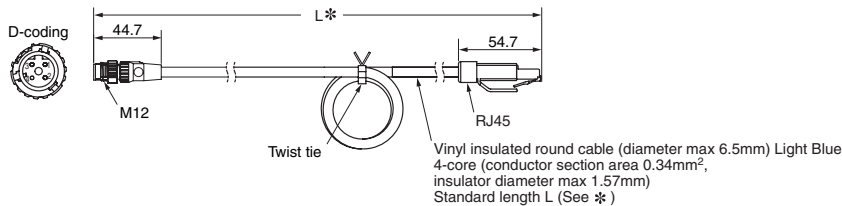
Power Cable
OS32C-CBL-□□M



* Sizes are as below

Model Number	L
OS32C-CBL-03M	3 m
OS32C-CBL-10M	10 m
OS32C-CBL-20M	20 m
OS32C-CBL-30M	30 m

Ethernet Cable
OS32C-ECBL-□□M



* Sizes are as below

Model Number	L
OS32C-ECBL-02M	2 m
OS32C-ECBL-05M	5 m
OS32C-ECBL-15M	15 m

Safety Precautions

Description shown below is only a guideline to choose a safety laser scanner.
To use the product properly, you must read the instruction manual that comes with the product.

Legislation and Standards

- Application of an OS32C sensor by itself cannot receive the type approval provided by Article 44-2 of the Labor Safety and Health Law of Japan. It is necessary to apply it as a system. Therefore, when using this product in Japan as a "safety system for presses and shearing machines" as prescribed in Article 42 of the Labor Safety and Health Law, the complete system must receive the type approval.
- This product is electro-sensitive protective equipment (ESPE) in accordance with European Union (EU) Machinery Directive Index Annex IV, B, Safety Components, Item 1.
 - This product complies with the following legislation and standards:
 - EU legislation
 - Machinery Directive 2006/42/EC
 - EMC Directive 2004/108/EC
 - Low Voltage Directive (2006/95/EC)
 - RoHS Directive (2002/95/EC)
 - European & International Standards
 - EN61496-1: 2004 + A1: 2008 (Type 3 ESPE)
 - EN62061: 2005
 - EN50178: 1999
 - EN ISO13849-1: 2008 + AC: 2009
 - IEC61496-3: 2008 (Type 3 AOPDDR)
 - IEC61508, Parts 1-7: 1998/2000 (SIL-2)
 - EN60204-1: 2006
 - North American Standards: per UL File E241445, US and C-UL approvals (CNN: NIPM/NIPM7).
 - ANSI/UL 508 (Industrial Control Equipment)
 - ANSI B11.19: 2003
 - ANSI/RIA R15.06: 1999
 - NFPA 79: 2007
 - Code of Federal Regulations CFR29: 1990
 - IEC 61496-1 (Type 3 ESPE)
 - IEC 61496-3 (Type 3 AOPDDR)
 - UL 1998 (Software in Programmable Components)
 - IEC 61508 (Functional Safety of Electrical/Electronic/Programmable Electronic Safety-Related Systems)

- IEC 61508-3 (Functional Safety of Electrical/Electronic/Programmable Electronic Safety-Related Systems - Part 3: Software Requirements)
 - CAN/CSA-C22.2 No. 14 (Industrial Control Equipment)
 - CAN/CSA-C22.2 No. 0.8 (Safety Functions Incorporating Electronic Technology)
 - JIS standards
 - JIS B 9704-1: 2006,
 - JIS B 9704-3: 2004 (Type3 ESPE)
- (3) This product received the following approvals from TÜV Rheinland of the EU.
- EC Type-Examination in accordance with the EU Machinery Directive,
Type 3 ESPE (IEC61496-1),
Type 3 AOPDDR (IEC61496-3)

Safety Precautions

The Alert symbols and their meanings ensure safe use of the products

In order to use the OS32C safely, the precautions listed in this manual are indicated by alert symbols. The descriptions must be followed, failure to follow all precautions and alerts may result in an unsafe installation or operation. The following indications and symbols are used.

	WARNING Indicates a potentially hazardous situation which, if not avoided, will result in minor or moderate injury, or may result in serious injury or death. Additionally there may be significant property damage.
	CAUTION Indicates a potentially hazardous situation which, if not avoided, will result in minor or moderate injury, or there may be property damage.

Meanings of Alert Symbols

	Indicates prohibited actions.
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⚠ WARNING

An OS32C is an electro-sensitive protective equipment designed to guard personnel working around hazardous machinery.

Whether a specific machine application and the OS32C system installation complies with safety regulations depends on the proper application, installation, maintenance and operation of the OS32C system. These items are the responsibility of the purchaser, installer and user.

User**⚠ WARNING**

The administrator is responsible for the selection and training of personnel to properly install, operate, and maintain the machine and its safeguarding systems.

An OS32C system should only be installed, verified and maintained by a qualified person. A qualified person is defined as "an individual who understands, is trained on, and demonstrates competence with the construction, operation or maintenance of the machinery and the hazards involved." (ANSI/PMMA B155.1-2006)

The machine requirements**⚠ WARNING**

The guarded machine must be able to stop anywhere in its cycle. Do not use an OS32C on a press with a full revolution clutch.

The guarded machine must have a consistent stopping time and adequate control mechanisms.

All safety-related machine control elements must be designed so that an alarm in the control logic or failure of the control circuit does not lead to a failure to danger.

Do not use the auxiliary output or warning output for safety applications. A human body may not be detected even if a failure of OS32C occurs, resulting in serious injuries.

Installation**⚠ WARNING**

The main unit must be securely mounted and its cable connectors must be tightly attached.

A start switch to release interlock must be installed where an operator can observe the monitored/guarded zone as a whole and cannot operate the switch within the hazardous zone.

A protective mechanism must be installed to prevent a hazardous condition in the event of a subsequent machine component failure. The OS32C does not protect against ejected flying material.

Severe smoke and particulate matter may degrade the efficiency of an OS32C, causing it to unexpectedly enter a Machine Stop state.

Use of mirrors or mirror-like objects in the protection plane must be avoided, as they can hide part of the area to be monitored/guarded.

Additional guarding may be required to prohibit access to dangerous areas not covered by the OS32C system.

Perform the test procedure in this document at installation, after maintenance, adjustment, repair or modification to the machine controls, tooling or the OS32C system.

Perform only the test and repair procedures outlined in the OS32C user's manual.

Additional measurement error resulting from reflective backgrounds may need to be added to the measurement error of the OS32C.

To use the protective function of the OS32C, a safety zone must be properly defined and configured.

If the response time is changed, re-calculation of the safety distance is required. This may require reconfiguration of the safety zones or re-installation of the OS32C. If the safety distance is not appropriate for the application, the machine may not stop before contact with the hazardous part, resulting in serious injuries or death.

When using more than one OS32C, mutual interference should be prevented. This may require different scanner positions or physical shields to be installed.

To ensure a protection degree of IP65, DO NOT use this product without proper sealing of the cable connector, I/O block, and scan window.

If the external zone switching device momentarily exceeds the configured number of active zone inputs during the zone switch, an additional Zone Delay may be incurred in the event that wiring of a zone set select input fails. The external zone switching device must properly sequence so the configured number of active inputs is not exceeded in order to guarantee that failed zone set select input wiring will be detected within the normal Zone Switching Time described below.

If an insufficient Zone Delay is used for the actual worst case switching time of the installation, the OS32C might start monitoring the wrong zone during the switching period !Also, if an insufficient Zone Delay is used for the actual worst case switching time of the installation, there might be a fault condition during the zone switching period!

If Tstart is configured without consideration of TmaxReaction, object detection within the new safety zone after switching and turning OFF of the safety outputs may be delayed.

Wiring**⚠ WARNING**

This product is designed for use on a 24 VDC, negative ground (protective earth) electrical system only. Never connect the OS32C to a positive ground (protective earth) system. If it is connected to positive ground, the guarded machine to be controlled may NOT stop, resulting in severe operator injury.

Do not connect OS32C voltage lines to DC power supplies with more than 24 VDC +25%/-30%. Do not connect them to AC power supply either. Either of the above will result in electrical shock or product malfunction.

For OS32C to meet IEC61496-1 and UL508, its DC power supply unit must satisfy all of the following conditions:

- Line voltage rated within (24 VDC +25%/-30%)
- Complying with EMC directives (industrial environments)
- Double-insulation or reinforced insulation between primary and secondary circuits
- Automatic return for overcurrent protection
- Output retention time of 20 ms or longer
- Satisfying output characteristics requirements of Class 2 circuit or limited voltage/current circuit defined in UL508.
- Power supply complying with regulations and standards of EMC and safety of electrical equipment in a country or a region where the OS32C is used. (Example: In EU, a power supply must comply with EMC directives for low-voltage)

To prevent an electrical shock, use double-insulation or reinforced insulation from hazardous voltage (such as 230 VAC).

Cable extension must be within a specified length. Otherwise it may result in a failure of the safety functions.

To use this product for a category 3 safety system, both of two safety outputs must be used to build the safety system controls circuit. Configuring the safety control system with only one safety output may result in serious injuries due to output circuit failure.

Protection of Cable at Installation:

Care should be taken when installing the OS32C cable. The cable must be properly routed and secured to ensure that damage does not occur.

Signal Connector Isolation:

The connectors used during installation must provide sufficient signal separation in order to prevent a short circuit condition of the input power and system signals.

Functional Earth:

The OS32C system requires a functional earth connection. Do not connect Functional Earth to a positive ground system. If it is connected to positive ground, the guarded machine to be controlled may NOT stop, resulting in severe operator injury.

Others

WARNING

Do not modify the main unit of the OS32C. Do not replace or fix any component of the OS32C other than the ones specified in the OS32C user's manual. Doing so may result in a failure of the safety functions.

If there is any damage to the window, replace it as soon as possible. Otherwise it may result in a failure of the OS32C. Take preventive measures when performing replacement work so that dust does not enter the OS32C.

Always detach all cables from the OS32C before replacing the scan window. Otherwise the motor may start rotating, resulting in injuries.

The tests outlined in this Test Procedure must be performed at time of installation, according to the user's regular inspection program and after any maintenance, tooling change, set up, adjustment, or modification to the OS32C system or the guarded machine. Where a guarded machine is used by multiple operators or shifts, it is suggested that the test procedure be performed at each shift or operation change and also if there is a change in the OS32C operating mode or defined zone sets. Testing ensures that the safety laser scanner and the machine control system are working properly to stop the machine. Failure to test properly could result in serious injury to personnel.

If the OS32C is operating in automatic start mode, make sure that the machine stops and does not restart as long as an object is detected in a safety zone. Check the operation by placing a test object into a safety zone. It is recommended that this test be performed after a shift change or 24 hours of operation.

If the safety system or the machine fails any of these tests, do not run the machine. Immediately tag or lock out the machine to prevent its use and notify the appropriate supervisor.

CAUTION

When transferring data from the PC to the OS32C and more than one OS32C is connected to the network, it is necessary to visually check the diagnostic code on the status/diagnostic display. It is recommended that the OS32C be installed in a position where the status/diagnostic display will be visible.

Take precautions to prevent dirt, dust or debris from entering the sensor and I/O block connectors.

It is recommended that this be done on a clean workstation as contaminants may degrade the performance of the OS32C.

Adhesion of dust to the scan window may cause a false operation. The OS32C will require periodic cleaning of the scan window and dust ring.

Operation of the OS32C may be affected by light in the environment, such as incandescent light, strobe light and light from a photosensor using infrared light.

Operation of the OS32C may be affected by substances in the environment, such as fog, smoke, steam and other small particles.

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